CATALOG DOCUMENTATION
EMAP SURFACE WATERS PROGRAM LEVEL DATABASE
1993-1996 MID-ATLANTIC STREAMS DATA
Validated Water Chemistry

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1. DATA SET IDENTIFICATION

1.1 Title of Catalog Document
EMAP Surface Waters

1.2 Authors of the Catalog Entry
U.S. EPA NHEERL Western Ecology Division
Corvallis, OR

1.3 Catalog Revision Date
January, 1999

1.4 Data Set Name
CHMVAL

1.5 Task Group
Surface Waters

1.6 Data Set Identification Code
0122

1.7 Version
002

1.8 Requested Acknowledgment
These data were produced as part of the U.S. EPA's Environmental Monitoring and Assessment Program (EMAP). If you publish these data or use them for analyses in publication, EPA requires a standard statement for work it has supported:

"Although the data described in this article have been funded wholly or in part by the U.S. Environmental Protection Agency through its EMAP Surface Waters Program, it has not been subjected to Agency review, and therefore does not necessarily reflect the views of the Agency and no official endorsement of the conclusions should be inferred."

2. INVESTIGATOR INFORMATION

2.1 Principal Investigator

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2.2 Investigation Participant - Sample Collection

Oregon State University
State of Virginia
State of West Virginia
State of Maryland
State of Pennsylvania
University of Maine
U.S. Fish and Wildlife Service
U.S. Environmental Protection Agency
Office of Research and Development
Region III

3. DATA SET ABSTRACT

3.1 Abstract of the Data Set

The primary function of the stream water chemistry samples is to determine acid-base status, trophic state, and classification of water chemistry type. Stream water stored in Cubitainers was used to measure major cations and anions, nutrients, turbidity, and color. Sealed syringe samples are analyzed for pH, dissolved inorganic carbon, and monomeric aluminum species (believed to be toxic to fish under acidic conditions. Waters samples are collected in sealed syringe to minimize contact with the atmosphere; the pH, dissolved inorganic carbon, and aluminum present in the water sample will all change if the stream water equilibrates with atmospheric carbon dioxide.

3.2 Keywords for the Data Set

Aluminum, alkalinity, acid neutralizing capacity, calcium, carbonate, color, specific conductance, dissolved inorganic carbon, dissolved organic carbon, bicarbonate, potassium, magnesium, ammonium, sodium, nitrate, total nitrogen, pH, total phosphorus, silica, total suspended solids, turbidity, absorbance, chlorophyll a, water chemistry, eutrophication

4. OBJECTIVES AND INTRODUCTION

4.1 Program Objective

The Environmental Monitoring and Assessment Program (EMAP) was designed to periodically estimate the status and trends of the Nation's ecological resources on a regional basis. EMAP provides a strategy to identify and bound the extent, magnitude and location of environmental degradation and improvement on a regional scale based on a probability-based statistical survey design.

4.2 Data Set Objective

This data set is part of a demonstration project to evaluate approaches to monitoring streams in EMAP. The data set contains the results of analysis of chemistry from a water column sample taken during spring low flow.

4.3 Data Set Background Discussion

Water chemistry in streams is analyzed for two purposes. First, to understand the chemical habitat within which biota must exist so that we can understand the biological potential of the system and second, to evaluate the chemical quality of the water for the purposes of determine the potential stresses to which the biota are exposed.

4.4 Summary of Data Set Parameters

Water chemistry parameters are reported for one sample taken at the midpoint of the selection stream reach. These include: aluminum, alkalinity, acid neutralizing capacity, calcium, carbonate, color, specific conductance, dissolved inorganic carbon, dissolved organic carbon, bicarbonate, potassium, magnesium, ammonium, sodium, nitrate, total nitrogen, pH, total phosphorus, silica, total suspended solids, and turbidity.

5. DATA ACQUISITION AND PROCESSING METHODS

5.1 Data Acquisition

5.1.1 Sampling Objective

To obtain a single grab sample of stream water for the purposes of chemical analysis during a two month sampling window from April through early June.

5.1.2 Sample Collection Methods Summary

A grab sample was taken below the surface using a 500 ml. beaker and then transferred to a 4-L Cubitainer according to the protocols identified in Lazorchak et.al (1998).

5.1.3 Sampling Start Date

April 1993

5.1.4 Sampling End Date

September 1996

5.1.5 Platform

NA

5.1.6 Sampling Gear
A 500 ml beaker was used to fill a 4-L Cubitainer from mid stream.

5.1.7 Manufacturer of Instruments
NA

5.1.8 Key Variables
NA

5.1.9 Sampling Method Calibration
NA

5.1.10 Sample Collection Quality Control
See Lazorchak, et al. 1998.

5.1.11 Sample Collection Method Reference
Chaloud, D.J. and D.V. Peck. 1994. Environmental Monitoring and Assessment Program: Integrated Quality Assurance Project Plan for the Surface Waters Resource Group, 1994 Activities. EPA 600/X-91/080, Rev. 2.00. U.S. Environmental Protection Agency, Las Vegas Nevada.

Lazorchak, J.M., Klemm, D.J., and Peck D.V. (editors). 1998. Environmental Monitoring and Assessment Program- Surface Waters: Field Operations and Methods for Measuring the Ecological Condition of Wadeable Streams. EPA/620/R-94/004F.
U.S. Environmental Protection Agency, Washington, D.C.

5.1.12 Sample Collection Method Deviations

5.2 DATA PREPARATION AND SAMPLE PROCESSING

5.2.1 Sample Processing Objective
See Lazorchak, et al. (1998) and Chaloud and Peck (1994).

5.2.2 Sample Processing Methods Summary
See Lazorchak, et al. (1998) and Chaloud and Peck (1994).

5.2.3 Sample Processing Method Calibration
See Lazorchak, et al. (1998) and Chaloud and Peck (1994).

5.2.4 Sample Processing Quality Control
See Lazorchak, et al. (1998) and Chaloud and Peck (1994).

5.2.5 Sample Processing Method Reference
See Lazorchak, et al. (1998) and Chaloud and Peck (1994).

6. DATA MANIPULATIONS

6.1 Name of New or Modified Values
None.

6.2 Data Manipulation Description

See Chaloud and Peck (1994).

7. DATA DESCRIPTION

7.1 Description of Parameters

Parameter SAS Name	Data Type	Len	Format	Parameter Label
ALDI	Num	8		Inorganic Monomeric Aluminum (ug/L)
ALDS	Num	8		PCV reactive (monomeric) aluminum (ug/L)
ALDSF	Char	6		Flag For ALDS
ALKCALC	Num	8		Calculated Alkalinity (ueq/L)
ALOR	Num	8		Nonexch. PCV (organic) aluminum (ug/L)
ALORF	Char	6		Flag For ALOR
ALTD	Num	8		Total Dissolved aluminum (ug/L)
ALTDF	Char	6		Flag For ALTD
ANC	Num	8		Gran Acid Neutralizing Capacity (ueq/L)
ANCF	Char	6		Flag For ANC
ANDEF	Num	8		Anion Deficit [C-A] (ueq/L)
ANSUM	Num	8		Sum of Anions (ueq/L)
CA	Num	8		Calcium (ueq/L)
CAF	Char	6		Flag for CA
CATSUM	Num	8		Sum of Cations (ueq/L)
CL	Num	8		Chloride (ueq/L)
CLF	Char	6		Flag For CL
CO3	Num	8		Calculated Carbonate (ueq/L)
COLOR	Num	8		Color (PCU)
COLORF	Char	6		Flag For COLOR
COM_FLD	Char	80		Field Sampling/Tracking Comments
COM_LAB	Char	80		Laboratory Analysis Comments
COND	Num	8		Specific Conductance (uS/cm)
CONDF	Char	6		Flag For COND
DATE_COL	Num	8	MMDDYY	Date stream visited
DAY_SHIP	Num	8		Number of Days for Sample to get to Lab
DIC	Num	8		Dissolved Inorganic Carbon (mg/L)
DICF	Char	6		Flag For DIC
DOC	Num	8		Dissolved Organic Carbon (mg/L)
DOCF	Char	6		Flag For DOC
FE	Num	8		Total Iron (mg/L)
FEF	Char	6		Flag for FE
H	Num	8		H+ from PHSTVL (ueq/L)
HCO3	Num	8		Calculated Bicarbonate (ueq/L)
IONSTR	Num	8		Ionic Strength (M)
K	Num	8		Potassium (ueq/L)
KF	Char	6		Flag for K
MG	Num	8		Magnesium (ueq/L)
MGF	Char	6		Flag for MG
MN	Num	8		Total Manganese (mg/L)
MNF	Char	6		Flag for MN
NA	Num	8		Sodium (ueq/L)
NAF	Char	6		Flag for NA

7.1 Description of Parameters, continued

NH4	Num	8	Ammonium (ueq/L)
NH4F	Char	6	Flag For NH4
NO3	Num	8	Nitrate (ueq/L)
NO3F	Char	6	Flag For NO3
NTL	Num	8	Total Nitrogen (ug/L)
NTLF	Char	6	Flag For NTL
OH	Num	8	Hydroxide from PHSTVL (ueq/L)
ORGION	Num	8	Est. Organic Anion (ueq/L)
PHEQ	Num	8	Air-equilibrated pH
PHEQF	Char	6	Flag For PHEQ
PHSTVL	Num	8	Closed System pH
PHSTVLF	Char	6	Flag For PHSTVL
PTL	Num	8	Total Phosphorous (ug/L)
PTLF	Char	6	Flag For PTL
SAMPLED	Char	30	Site Sampled Code
SIO2	Num	8	Silica (mg/L)
SIO2F	Char	6	Flag For SIO2
SO4	Num	8	Sulfate (ueq/L)
SO4F	Char	6	Flag For SO4
SOBC	Num	8	Sum of Base Cations (ueq/L)
STRM_ID	Char	6	Stream ID
TEAM_ID	Char	1	Sampling crew
TRANSECT	Char	8	Transect ID
TSS	Num	8	Total Suspended Solids (mg/L)
TSSF	Char	6	Flag For TSS
TURB	Num	8	Turbidity (NTU)
TURBF	Char	6	Flag For TURB
VISIT_NO	Num	8	Visit Number
YEAR	Num	8	Site year of data collection

7.1.6 Precision to which values are reported

7.1.7 Minimum Value in Data Set

Name	Min
ALDI	0
ALDS	16
ALKCALC	-1348.95
ALOR	0
ALTD	0
ANC	-2120
ANDEF	-11712.13
ANSUM	76.2
CA	27.9
CATSUM	85.51
CL	7
CO3	0
COLOR	0
COND	10
DATE_COL	04/26/1993
DAY_SHIP	1

7.1.7 Minimum Value in Data Set, continued

DIC	0.2501
DOC	0.05
FE	0
H	0
HCO3	0.008
IONSTR	0
K	4.3
MG	9.9
MN	0
NA	6.5
NH4	0
NO3	0
NTL	27
OH	0
ORGION	0.49
PHEQ	3
PHSTVL	2.87
PTL	0
SIO2	0.96
SO4	6
SOBC	60.7
TSS	0
TURB	0.1
VISIT_NO	1
YEAR	1993

7.1.7 Maximum Value in Data Set

Name	Max
ALDI	38408
ALDS	38800
ALKCALC	5760.05
ALOR	392
ALTD	79200
ANC	5620
ANDEF	978.77
ANSUM	33967.03
CA	12015.9
CATSUM	22254.9
CL	2527
CO3	95.76
COLOR	93
COND	2514.5
DATE_COL	09/15/1996
DAY_SHIP	5
DIC	73.5
DOC	12
FE	74.5
H	1348.963
HCO3	5696.51
IONSTR	0.11

7.1.7 Maximum Value in Data Set, continued

K	437.2
MG	11680.9
MN	26.5
NA	7308
NH4	232.1
NO3	1373
NTL	21730
OH	3.98
ORGION	119.51
PHEQ	8.82
PHSTVL	8.6
PTL	694
SIO2	27
SO4	33786
SOBC	21416.6
TSS	363
TURB	200
VISIT_NO	9
YEAR	1996

7.2 Data Record Example

7.2.1 Column Names for Example Records

```
"ALDI","ALDS","ALDSF","ALKCALC","ALOR","ALORF","ALTD","ALTDF","ANC","ANCF",
"ANDEF","ANSUM","CA","CAF","CATSUM","CL","CLF","CO3","COLOR","COLORF",
"COM_FLD","COM_LAB","COND","CONDF","DATE_COL","DAY_SHIP","DIC","DICF","DOC",
"DOCF","FE","FEF","H","HCO3","IONSTR","K","KF","MG","MGF","MN","MNF","NA",
"NAF","NH4","NH4F","NO3","NO3F","NTL","NTLF","OH","ORGION","PHEQ","PHEQF",
"PHSTVL","PHSTVLF","PTL","PTLF","SAMPLED","SIO2","SIO2F","SO4","SO4F",
"SOBC","STRM_ID","TEAM_ID","TRANSECT","TSS","TSSF","TURB","TURBF",
"VISIT_NO","YEAR"
```

7.2.2 Example Data Records

```
.,.," ",106.05,.," ",54," ",115," ",82.45,770.73,303.4,"V",853.17,229,
" ",0.015,8," "," "," ",102.5," ",05/17/1994,.,3.2301," ",2.43,"H15",0.06,
" ",0.676,106.699,0.002,67," ",213.1," ",0.05," ",266.2," ",2.8," ",303,
" ",4882," ",0.015,22.66,7.38," ",6.17," ",15," ","Yes",15.94," ",132,
" ",849.7,"DE750S","3","X",2.8," ",3.6," ",1,1994

.,S," ",210.7,S," ",36," ",207.2," ",52.29,728.14,528.9," ",780.42,44,
" ",0.16,13," ","very silty; heavy rains previous 24 hrs"," ",90.6,
" ",05/15/1995,2,3.2301," ",2.7," ",0.06," ",0.123,210.596,0.002,20.2,
" ",147.2," ",0.07," ",84," ",0," ",30.3," ",719," ",0.081,26.33,7.57,
" ",6.91," ",25," ","Yes",3.47," ",443," ",780.3,"MD003S","3","X",13.8,
"H8",9.6," ",1,1995
```

7.2.2 Example Data Records, continued

```
.,S," ",73.51,S," ",47," ",82.2," ",31.79,328.43,181.6," ",360.22,85,
" ",0.032,30," "," ",
"DIC:Original value of 87 replaced with estimated value of 110 µmol/l.",
42.4," ",05/15/1995,2,1.32,"X2",3.64," ",0.22," ",0.219,73.651,0.001,15.6,
" ",80.6," ",0.02," ",82.2," ",0," ",9.7," ",465," ",0.046,35.11,7.15," ",
6.66," ",23," ","Yes",3.43," ",160," ",360,"MD005S","3","X",7.7,"H8",4.1,
" ",1,1995
```

8. GEOGRAPHIC AND SPATIAL INFORMATION

8.1 Minimum Longitude
-83 Degrees 14 Minutes 39 Seconds West (-83.24444 Decimal Degrees)

8.2 Maximum Longitude
-74 Degrees 15 Minutes 32 Seconds West (-74.25890 Decimal Degrees)

8.3 Minimum Latitude
36 Degrees 33 Minutes 12 Seconds North (36.55350 Decimal Degrees)

8.4 Maximum Latitude
42 Degrees 21 Minutes 20 Seconds North (42.35566 Decimal Degrees)

9. QUALITY CONTROL / QUALITY ASSURANCE

9.1 Data Quality Objectives
See Chaloud and Peck (1994)

9.2 Quality Assurance Procedures
See Chaloud and Peck (1994)

9.3 Unassessed Errors
NA

10. DATA ACCESS

10.1 Data Access Procedures

10.2 Data Access Restrictions

10.3 Data Access Contact Persons

10.4 Data Set Format

10.5 Information Concerning Anonymous FTP

10.6 Information Concerning WWW

10.7 EMAP CD-ROM Containing the Data

11. REFERENCES

Chaloud, D.J. and D.V. Peck. 1994. Environmental Monitoring and Assessment Program - Surface Waters: Integrated Quality Assurance Project Plan for the Surface Waters Resource Group. U.S. Environmental Protection Agency. Office of Research and Development. Washington, D.C.

Lazorchak, J.M., Klemm, D.J., and Peck D.V. (editors). 1998. Environmental Monitoring and Assessment Program- Surface Waters: Field Operations and Methods for Measuring the Ecological Condition of Wadeable Streams. EPA/620/R-94/004F.
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12. TABLE OF ACRONYMS

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